Fisher® LCP100 Local Control Panel

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Figure 1. Fisher LCP100 Local Control Panel, with FIELDVUE DVC6200 SIS Digital Valve Controller and Bettis™ Actuator

Introduction

Scope of Manual

This instruction manual includes installation and maintenance information for the Fisher LCP100 local control panel (figure 1). This device is used with Fisher FIELDVUE™ instruments in Safety Instrumented Systems (SIS). Refer to the DVC6200 SIS Digital Valve Controllers for Safety Instrumented System (SIS) Solutions instruction manual (D103557X012) or the DVC6000 SIS Digital Valve Controllers for Safety Instrumented System (SIS) Solutions instruction manual (D103230X012) for additional information.

Unless otherwise noted, the information in this instruction manual applies to both DVC6200 SIS and DVC6000 SIS digital valve controllers. For simplicity, the DVC6200 SIS model name will be used throughout.

Do not install, operate, or maintain an LCP100 local control panel without being fully trained and qualified in valve, actuator, and accessory installation, operation, and maintenance. **To avoid personal injury or property damage, it is important to carefully read, understand, and follow all of the contents of this manual, including all safety cautions and warnings.** If you have any questions about these instructions, contact your Emerson Process Management sales office.

Table 1. Specifications

Power Options (switch selectable)

■ External: 24 VDC +/- 10% @ 50 mA maximum continuous current (100 mA maximum inrush)
■ Loop: 8-20 mA (LCP100 and DVC6200 SIS combined)

Temperature Limits(1)

-40 to 65°C (-40 to 149°F)

Maximum distance between LCP100 and DVC6200 SIS digital valve controller

Cable length is limited by maximum cable capacitance of 100,000 pF(2). Typical 314 meters (1030 feet) with 18 AWG shielded Audio, Control and Instrumentation Cable.

Electrical Classification

CSA
Ex em IIC T4
Suitable for Zone 1 and Zone 2 locations

ATEX
Ex e mb [ib] IIC T4 Gb
Suitable for Zone 1 and Zone 2 locations
Ex ic IIC T4 Gc
Suitable for Zone 2 locations

IECEx
Ex e mb [ib] IIC T4 Gb
Suitable for Zone 1 and Zone 2 locations
Ex ic IIC T4 Gc
Suitable for Zone 2 locations

Refer to Hazardous Area Classifications and Special Instructions for "Safe Use" and Installation in Hazardous Locations, starting on page 3, for specific approval information.

Electrical Housing

IP66

Electromagnetic Interference (EMI)

Meets EN 61326-1 (First Edition)
Immunity—Industrial locations per Table 2 of EN 61326-1 Standard. Performance is shown in table 2 below.
Emissions—Class A
ISM equipment rating: Group 1, Class A

Connections

Conduit: 3/4 NPT or M20

Wiring

14 to 26 AWG

Torque Specifications

Wiring terminals: 0.5 N•m (4.5 in•lbs)

Electrical Installation

Wire connections are polarity sensitive

Compatibility

DVC6200 SIS with Firmware revision 3 or later
DVC6000 SIS with Firmware revision 7 or later

Installation Orientation

Wiring entrance must be pointed down for self-draining

Dimensions

253.1 mm (10 inches) long by 109.5 mm (4.3 inches) wide by 127.8 mm 5 inches) deep. See figure 8.

Construction Materials

Housing material: filled polyester

Approximate Weight

2.2 kg (4.9 lbs)

1. The pressure/temperature limits in this document and any applicable standard or code limitation should not be exceeded.
2. DVC6000 SIS: Cable length is limited by maximum cable capacitance of 18000 pF.

Description

The LCP100 local control panel is used with the HART® communicating DVC6200 SIS digital valve controller. This panel is used to manually open and close a safety shutdown valve. The LCP100 also provides a manual reset feature as well as a button for initiating a partial stroke test.

Specifications

Typical specifications for the LCP100 local control panel are shown in table 1.

Table 2. Electromagnetic Immunity Performance Criteria

Port	Phenomenon	Basic Standard	Test Level	Performance Criteria(1)
Enclosure	Electrostatic discharge (ESD)	IEC 61000-4-2	± 4 kV contact ± 8 kV air	A
	Radiated EM field	IEC 61000-4-3	80 to 1000 MHz @ 10V/m with 1 kHz AM at 80% 1400 to 2000 MHz @ 3V/m with 1 kHz AM at 80% 2000 to 2700 MHz @ 1V/m with 1 kHz AM at 80%	A
I/O signal/control	Burst (fast transients)	IEC 61000-4-4	± 1 kV, I/O lines ± 2 kV, DC power lines	A
	Surge	IEC 61000-4-5	± 1 kV, I/O lines ± 2 kV, DC power lines)	A
	Conducted RF	IEC 61000-4-6	150 kHz to 80 MHz at 3 Vrms with 1 kHz AM at 80%	A

Specification limit = ±1% of span
1. A = No degradation during testing. B = Temporary degradation during testing, but is self-recovering.

Installation

⚠ WARNING

Electrostatic charge hazard. Do not rub or clean the LCP100 with solvents if a flammable vapor is present. To do so could result in an explosion.

Note

Inside the LCP100 compartment, direct all wiring to the left side; away from the buttons.

Hazardous Area Classifications and Special Instructions for "Safe Use" and Installation in Hazardous Locations

Certain nameplates may carry more than one approval, and each approval may have unique installation/wiring requirements and/or conditions of "safe use". These special instructions for "safe use" are in addition to, and may override, the standard installation procedures. Special instructions are listed by approval.

⚠ WARNING

Failure to follow these conditions of "safe use" could result in personal injury or property damage from fire or explosion, and area re-classification.

Note

This information supplements the nameplate markings affixed to the product.

Always refer to the nameplate itself to identify the appropriate certification.

If the LCP100 is connected to a DVC6200 SIS in a zone 1 explosion proof "d" environment, there must be a conduit seal installed between the DVC6200 SIS and the LCP100 in order to maintain the explosion proof integrity of the DVC6200 SIS. Refer to figures 11 and 12.

The LCP100 can be connected to a DVC6200 SIS that is part of an intrinsically safe system provided that you follow the instructions for the LCP100 Ex ic installation, as shown in figures 4 and 7. The overall intrinsically safe system would be rated as an Ex ic system.

For all other approvals use zone 1 approved wiring practices.

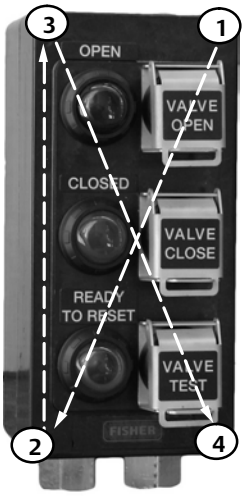
CSA

Ex em IIC, IP66
Rated 30 VDC maximum; 100 mA maximum; temperature code rating T4, ambient temperature range -40°C to 65°C

Special Conditions of Use

1. Install in an area that has a low risk of mechanical damage.
2. Install the cover, tightening the screws evenly in a criss-cross pattern such as the one indicated in figure 2 to help ensure the cover is properly installed.

Figure 2. Proper Cover Installation



NOTE: TIGHTEN THE SCREWS IN A CRISS-CROSS PATTERN TO HELP ENSURE PROPER COVER INSTALLATION

ATEX / IECEx

ATEX: II 2G Ex e mb [ib] IIC T4 Gb
II 3G Ex ic IIC T4 Gc
IECEX: Ex e mb [ib] IIC T4 Gb
Ex ic IIC T4 Gc

Ta = -40°C to +65°C
IP66

Entity parameters for intrinsically safe applications: Ui = 27 VDC, Ci = 1.1 nF, and Li = 0

Standards Used for Certification

IEC 60079-0:2004	IEC 60079-11:2006	EN 60079-7:2007
IEC 60079-0:2007	IEC 60079-18:2004	EN 60079-11:2007
IEC 60079-7:2006	EN 60079-0:2006	EN 60079-18:2004

Special Conditions for Safe Use

1. For Ex ic installations, it is not permitted to connect separate supplies to the LOOP+/LOOP- and AUX+/LOOP- terminals.
2. If the equipment is installed in a zone 2, the installer shall take suitable steps to indicate whether the equipment is installed as Ex e mb [ib] or Ex ic.

Mounting

Refer to figure 8 for dimensional information. The LCP100 local control panel has four (4) mounting holes for on-site mounting of the device. The LCP100 must be installed so that the wiring connections are on the bottom to prevent accumulation of moisture inside the box.

Electrical Connections

⚠ WARNING

Select wiring and/or cable glands that are rated for the environment of use (such as hazardous location, ingress protection, and temperature). Failure to use properly rated wiring and/or cable glands can result in personal injury or property damage from fire or explosion.

Wiring connections must be in accordance with local, regional, and national codes for any given hazardous area approval. Failure to follow the local, regional, and national codes could result in personal injury or property damage from fire or explosion.

Electrical connections for explosion-proof applications are shown in figures 3, 5, and 6. Electrical connections for intrinsically safe applications are shown in figures 4 and 7.

Note

For intrinsically safe applications, the LCP100 forms an intrinsically safe explosion protection system when used with intrinsically safe associated apparatus (a barrier) or with any other intrinsically safe devices.

The following requirements must be met: $U_o \leq U_i$, $I_o \leq I_i$, $P_o \leq P_i$, $C_o \geq C_i + C_c$, $L_o \geq L_i + L_c$.

There are two methods to power the LCP100. Method one requires an external 24 VDC source to power the LCP100. Method two uses loop power wiring in series.

In method one, shown in figure 3 or 4, signal wiring is brought to the enclosure through a 3/4 NPT or M20 housing conduit connection (connection type is identified on nameplate).

Method two can be accomplished in two ways; with the wiring going first to the LCP100, then to the DVC6200 SIS, as shown in in figure 5, or with the wiring going first to the DVC6200 SIS, then to the LCP100, as shown in figure 6 or 7. However, because the LCP100 does consume energy to drive the pushbuttons and lights, the minimum current signal from the logic solver must be 8 mA. If the logic solver cannot provide an output range of 8-20 mA, then method one must be used.

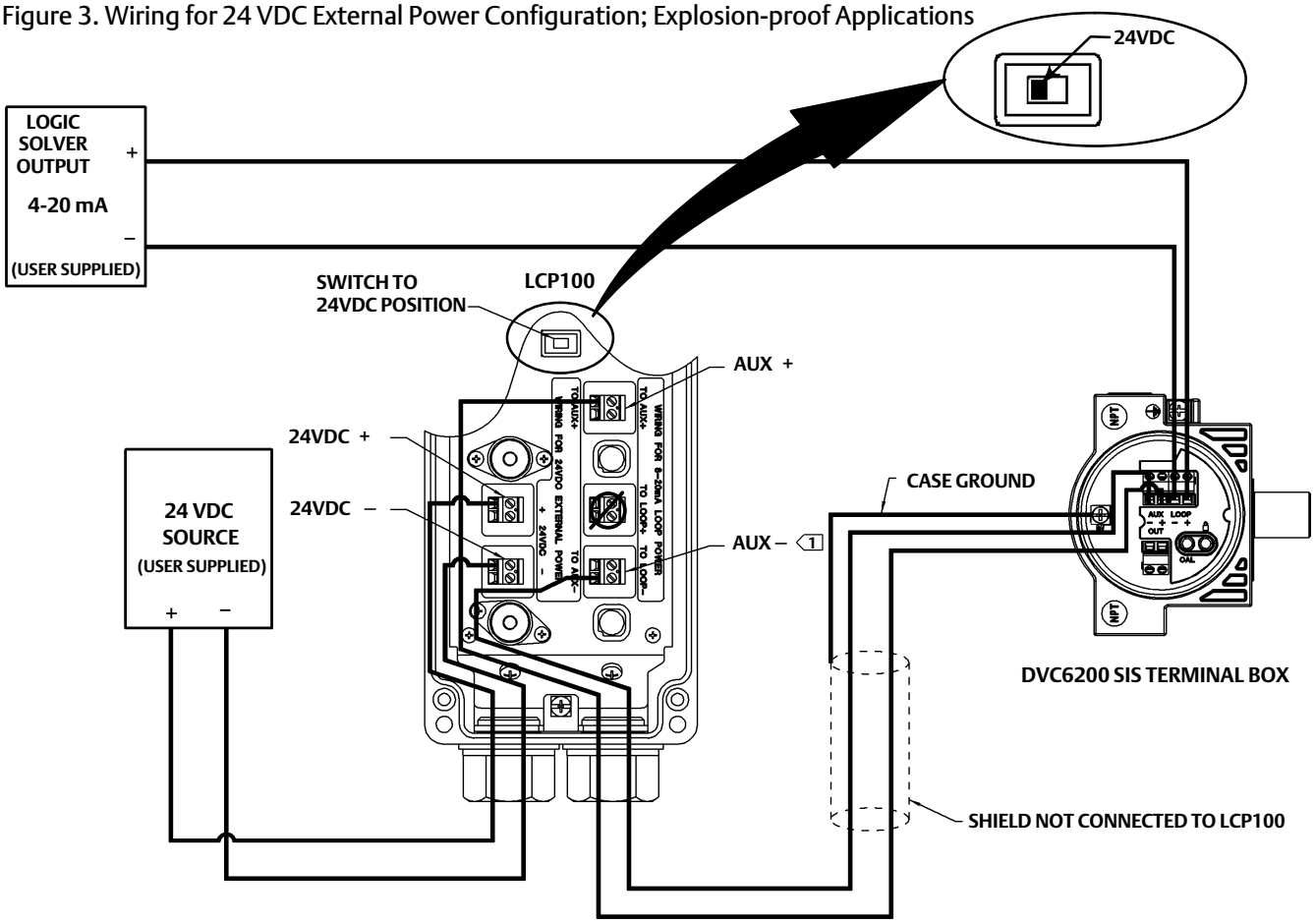
When connections are complete move the DIP switch to the appropriate power setting. If external 24 VDC is used to power the LCP100, make sure the switch is on the side that says “24VDC”. If loop power is used, slide the switch to the side that says “LOOP”.

Note

Factory default for the DIP switch power selector is 24VDC.

When installing the cover, tighten the screws evenly in a criss-cross pattern such as the one indicated in figure 2 to help ensure the cover is properly installed.

Figure 3. Wiring for 24 VDC External Power Configuration; Explosion-proof Applications



SIMPLE METHOD FOR INSTALLING AN LCP100 TO AN EXISTING DVC6200 SIS INSTRUMENT WHEN 24 VDC POWER IS AVAILABLE

NOTE: DO NOT CONNECT THE LOOP + TERMINAL IN THE LCP100 TO THE LOOP + TERMINAL IN THE DVC6200 SIS. THIS WILL CAUSE THE LCP100 TO UNNECESSARILY CONSUME 4 mA AT THE EXPENSE OF THE DVC6200 SIS.
1 THIS CONNECTION IS ALSO LABELED LOOP -.

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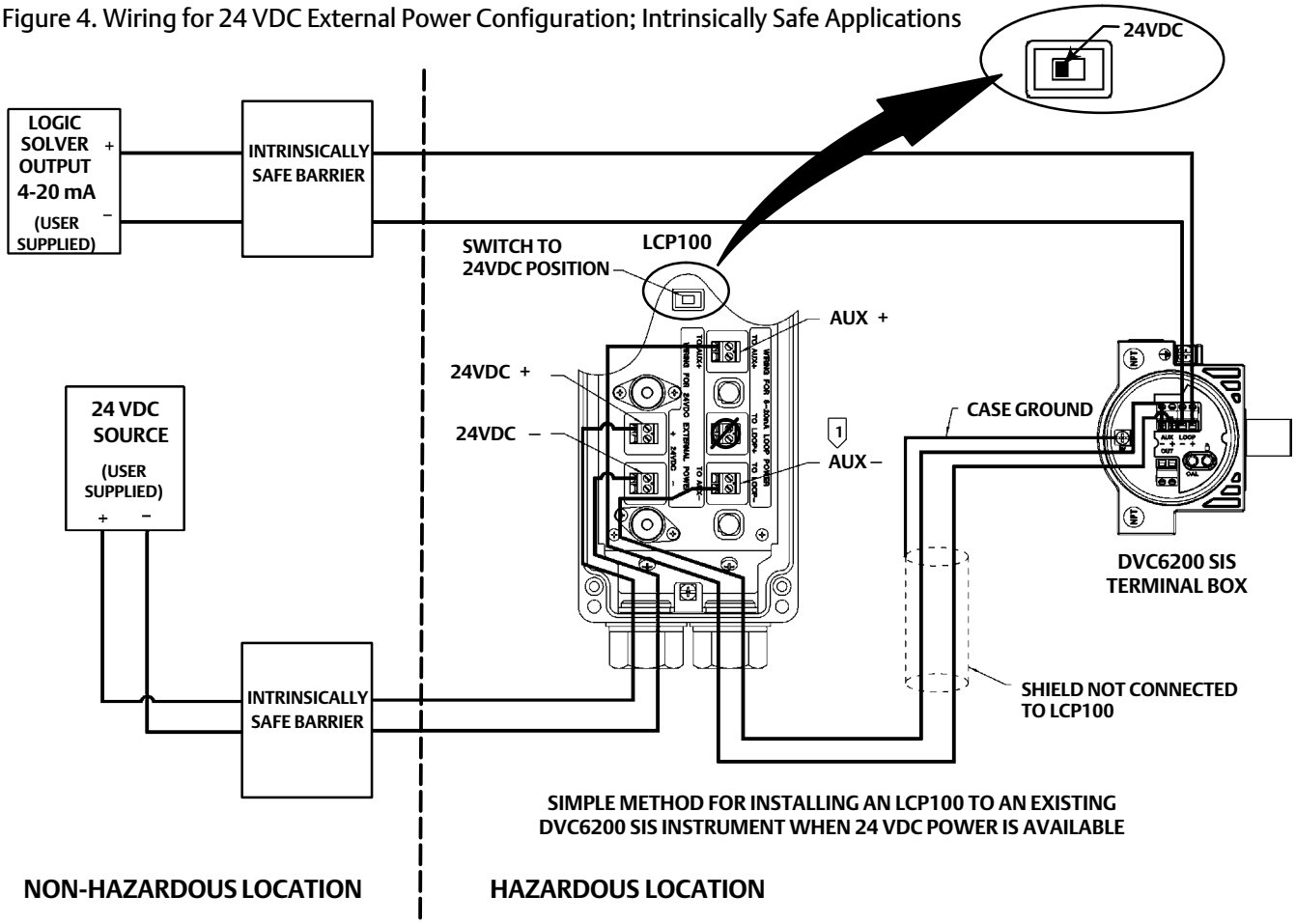
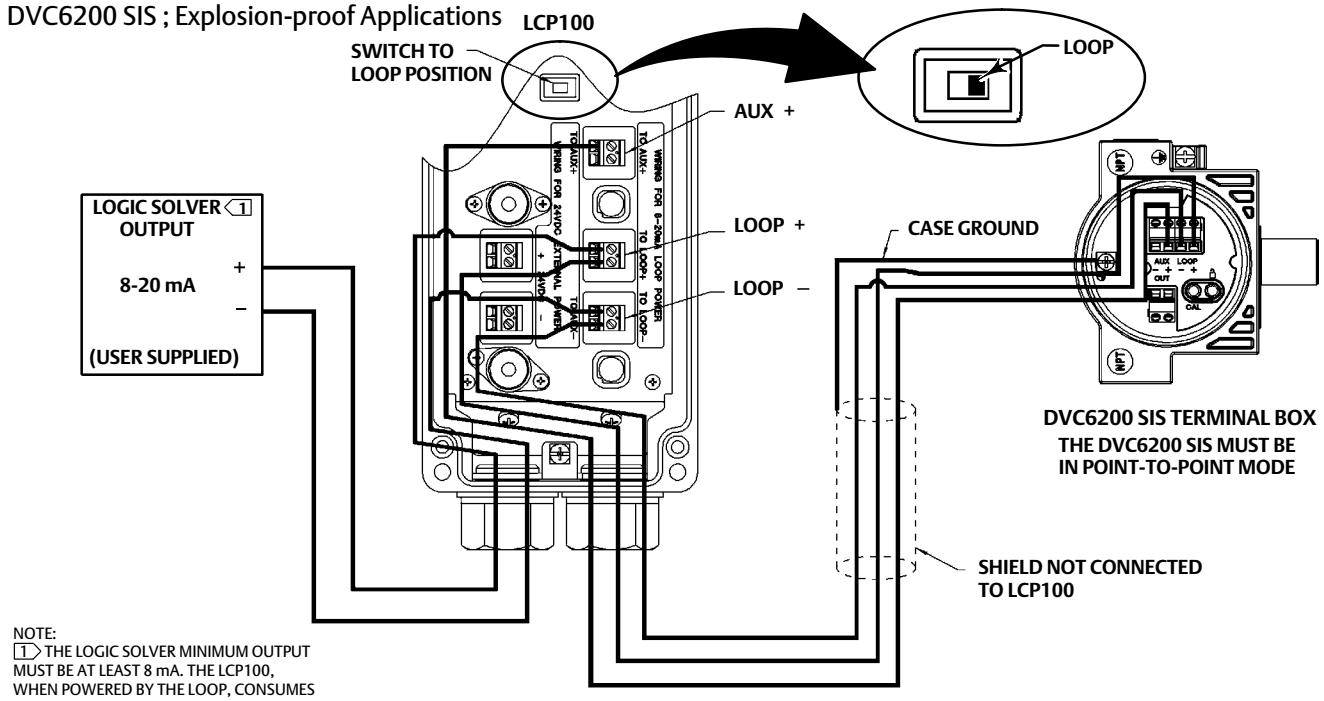
Figure 4. Wiring for 24 VDC External Power Configuration; Intrinsically Safe Applications



NOTE: DO NOT CONNECT THE LOOP + TERMINAL IN THE LCP100 TO THE LOOP + TERMINAL IN THE DVC6200 SIS. THIS WILL CAUSE THE LCP100 TO UNNECESSARILY CONSUME 4 mA AT THE EXPENSE OF THE DVC6200 SIS.

1 THIS CONNECTION IS ALSO LABELED LOOP -.

Figure 5. Wiring for Loop-Powered Configuration; Logic Solver Wired to the Fisher LCP100 then the FIELDVUE DVC6200 SIS ; Explosion-proof Applications



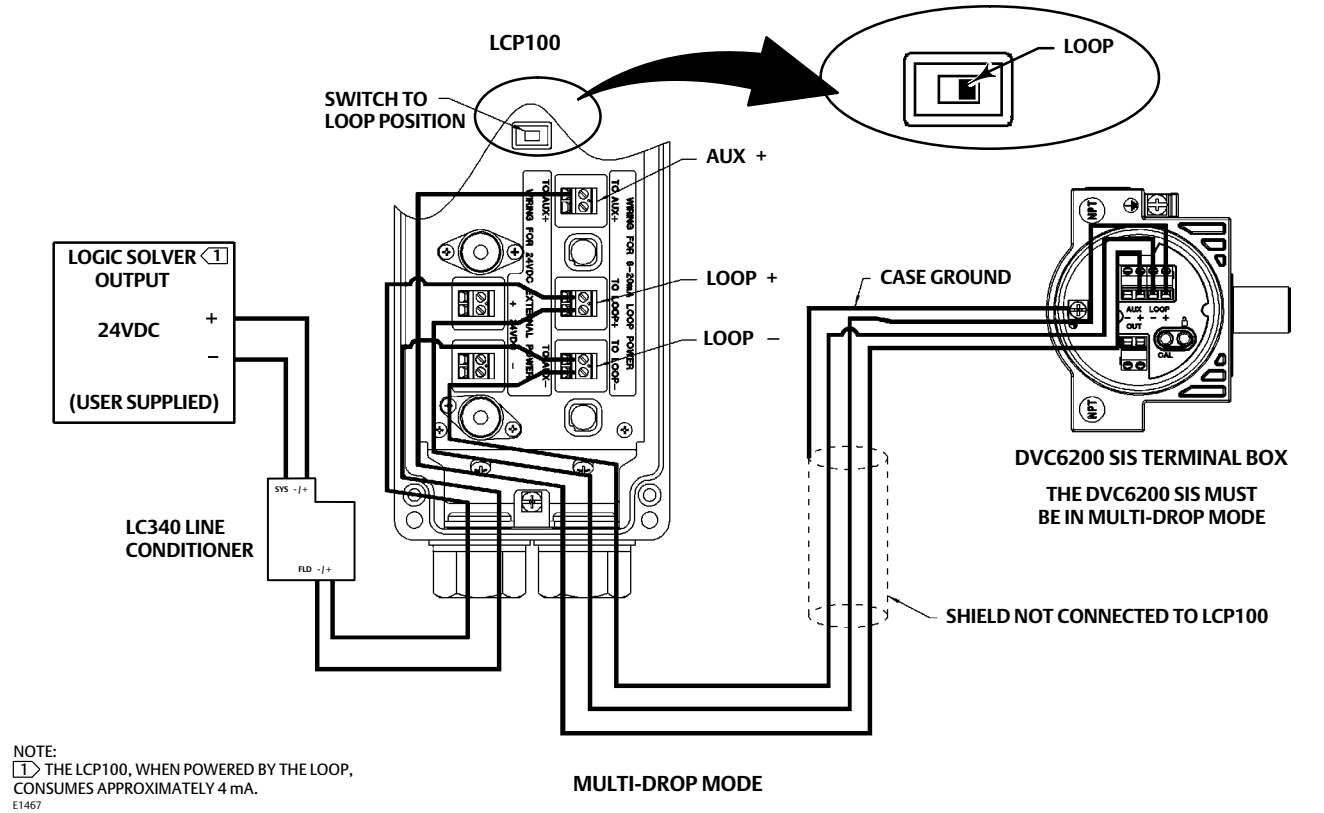
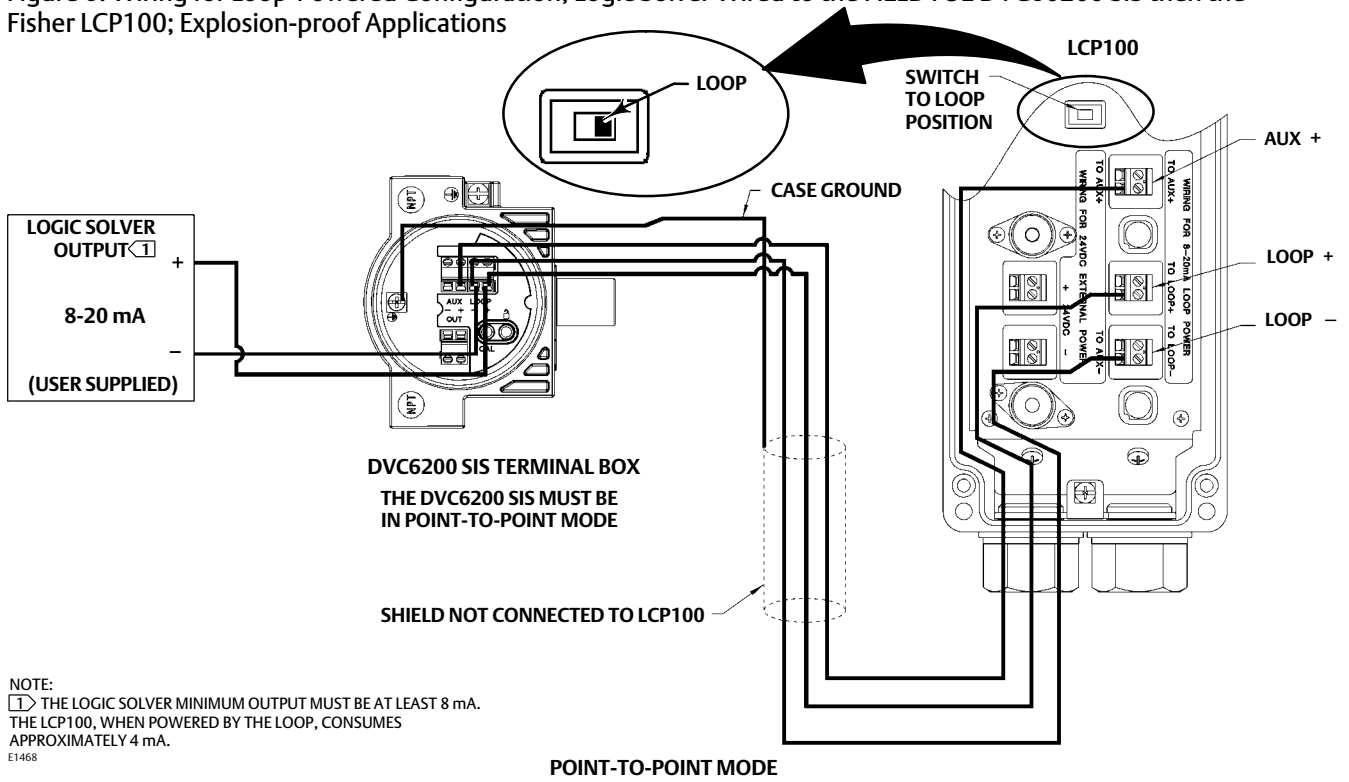


Figure 6. Wiring for Loop-Powered Configuration; Logic Solver Wired to the FIELDVUE DVC60200 SIS then the Fisher LCP100; Explosion-proof Applications



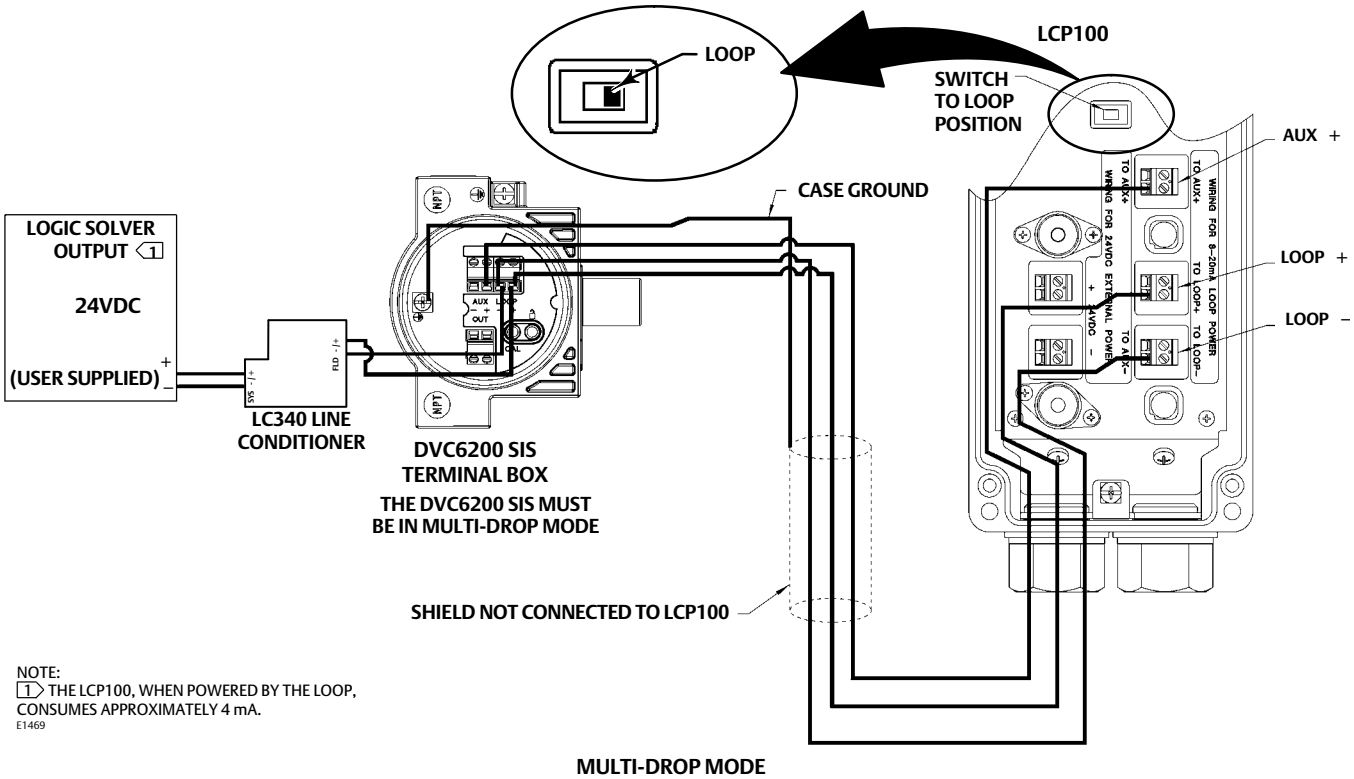
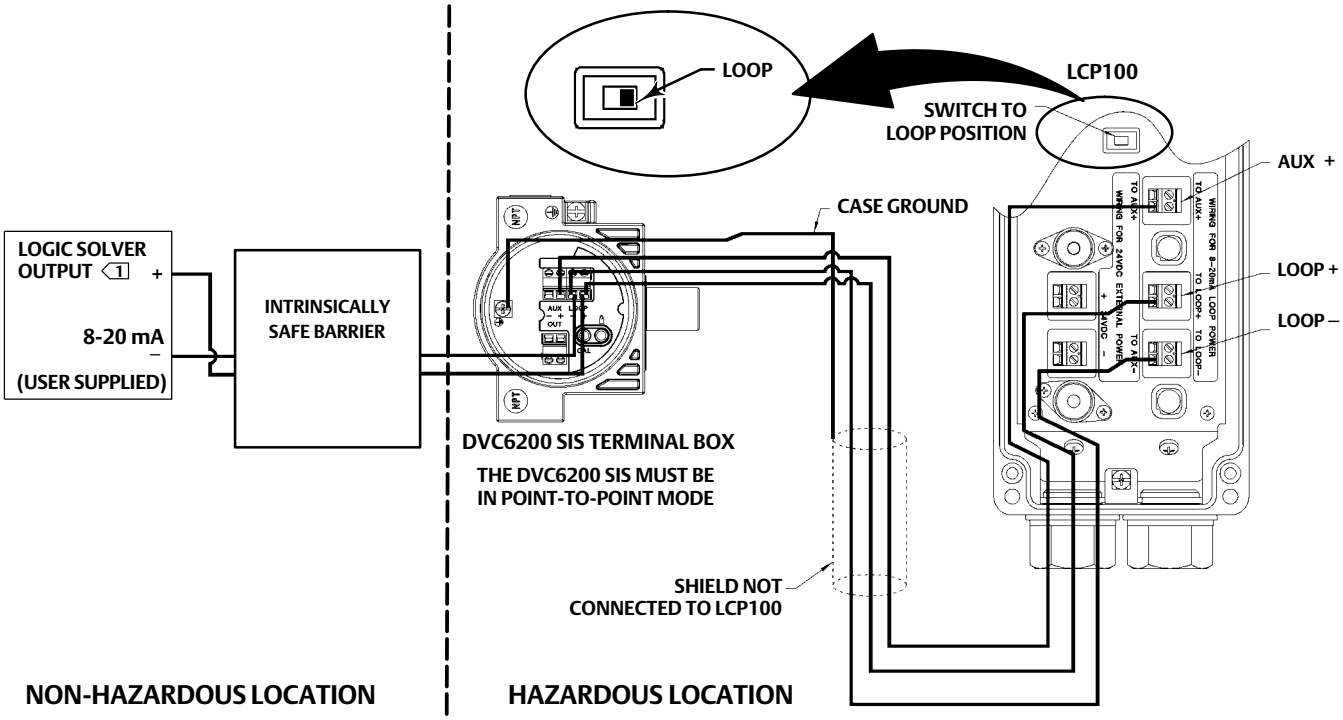
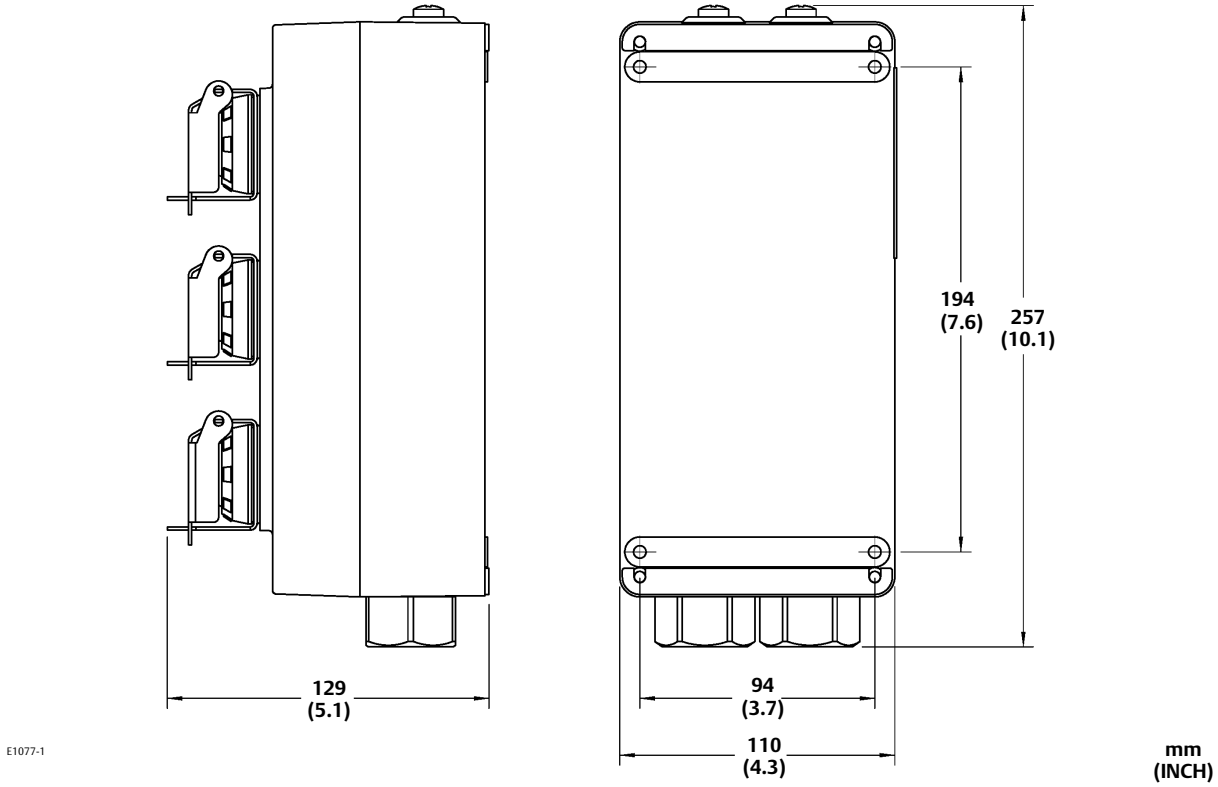


Figure 7. Wiring for Loop-Powered Configuration; Logic Solver Wired to the FIELDVUE DVC60200 SIS then the Fisher LCP100; Intrinsically Safe Applications



NOTE:
1 THE LOGIC SOLVER MINIMUM OUTPUT MUST BE AT LEAST 8 mA. THE LCP100, WHEN POWERED BY THE LOOP, CONSUMES APPROXIMATELY 4 mA.

Figure 8. Fisher LCP100 Local Control Panel Dimensions



Pre-Setup Testing

Before connecting the LCP100 to the process, conduct the following tests on the LCP100 connected to the DVC6200 SIS.

Successful Partial Stroke Test

1. Press the Valve Test (bottom) pushbutton for more than 3 seconds (but less than 10 seconds).
2. Observe that the green light starts flashing when the valve starts moving.
3. Observe that the valve moves no more than the configured partial stroke test travel limit.
4. Observe that the valve returns to the normal operating position and the green light comes on solid.

Manually Aborted Partial Stroke Test

1. Press the Valve Test (bottom) pushbutton for more than 3 seconds (but less than 10 seconds).
2. Observe that the green light starts flashing when the valve starts moving.
3. Before the valve reaches the travel limit of the configured partial stroke test, press the Valve Test pushbutton, or the pushbutton next to the green light.
4. Observe that the valve immediately returns to the normal operating position and the green light comes on solid.

Emergency Demand through the Logic Solver

1. Reduce the current to the DVC6200 SIS to 4 mA (for de-energize to trip operation).

Note

For a loop powered installation, a minimum current of 8 mA is required at the trip state / "Safety Demand" for proper functioning of the pushbuttons and lights.

2. Observe that the valve moves to its fail safe state.
3. Observe that the red light comes on solid and the yellow light stays off.
4. Press the pushbutton next to the green light and observe that the valve does not move.
5. Increase the current to the DVC6200 SIS to 20 mA (for de-energize to trip) and observe that the valve remains in its fail safe state.
6. Observe that the red light stays on solid and the yellow light comes on solid (ready to reset).
7. Press the pushbutton next to the green light.
8. Observe that the red light goes off, the valve moves to its normal operating position, and then the green light comes on solid.

Emergency Demand through Local Control Panel

1. Press the pushbutton next to the red light.
2. Observe that the valve moves to it fail safe position.
3. Observe that the red light comes on solid and the yellow light comes on solid (ready to reset).
4. Press the pushbutton next to the green light.
5. Observe that the red light goes off, the valve moves to its normal operating position, and then the green light comes on solid.

Setup

In order for the LCP100 to operate properly, it must be connected to a DVC6200 SIS with firmware revision 3 or later, or a DVC6000 SIS device with firmware revision 7 or later. Once the physical connections are made, use the following checklist to configure the LCP100. Refer to the DVC6200 SIS instruction manual (D103557X012) or the DVC6000 SIS instruction manual (D103230X012) if additional setup information is needed.

- Using a 475 Field Communicator select *Configure* > *Guided Setup* > *Device Setup*. Follow the prompts on the Field Communicator:

Enter Supply Pressure and Unit

Enter Actuator Make, Model, and Size

Enter Partial Stroke test Starting Point, Relay Type and Zero Power Condition [select the "instrument connected to local control panel (LCP100)" option]

- Follow the prompts to complete Device Setup. The following parameters will be automatically set under Travel Alerts:
  - Hi Hi / Lo Lo Enable - Yes
  - Lo Lo Point (%) - 1
  - Hi Hi Point (%) - 99
  - Deadband (%) - 0.5
  - DVC Power Up - Manual Reset
- Continue to set up the digital valve controller according the normal set up procedure.
- Remember to place the instrument back in service before disconnecting.

Note

An alternative method to configure the LCP100 is through Detailed Setup. Using the Field Communicator, select *Configure* > *Manual Setup* > *Instrument* > *Terminal Box* > *Edit Auxiliary Terminal Action* > *SIS Local Control Panel*. When this setting is downloaded to the device, an information screen will pop up advising that some additional parameters will be configured. Select Yes.

Principle of Operation

The lights indicate the state of the valve as described in table 3.

Table 3. Fisher LCP100 Light and Button Operation

WHAT THE LCP100 LIGHTS SHOW...		POSSIBLE CONDITIONS...	PRESS INDICATED BUTTON TO...		
			Top	Middle	Bottom
Green	Solid	The valve is in its normal operating state.	---	Trip	Run PST
	Fast Blink (1/2 second)	The valve is in the process of running a partial stroke test (PST).	Stop PST	Trip	Stop PST
		The valve is not at its normal operating position because the actuator pressure is low or the valve is stuck.	Acknowledge PST Failure	Trip	Run PST
		The valve is tripped but is stuck at the normal position.	---	---	---
	Slow Blink (1 second)	A partial stroke test has failed.	Acknowledge PST Failure	Trip	Run PST
Red	Solid	The valve is tripped due to loss of actuator pressure (e.g., solenoid valve trip)	Acknowledge PST Failure	Trip	Run PST
		The valve is tripped due to a command from the logic solver or LCP100.	---	---	---
		The valve is stuck in the tripped state.	---	---	---
	Fast Blink (1/2 second)	The valve is at mid-travel after a trip. The valve may be moving or stuck in this position.	---	---	---
Yellow	Solid	The valve may be reset to the normal operating state.	Reset to Normal State	---	---

NOTES
1. If the green, red, and yellow lights are blinking in sequence, then the DVC6200 SIS is out of service. In point-to-point mode, the DVC6200 SIS will not respond to a trip from the logic solver.
2. Depending on the emergency shutdown valve configuration, the top button could be labeled "Valve Open" and the middle button could be labeled "Valve Close"; or vice versa. The bottom button will aways be labeled "Valve Test".
3. Acknowledgment of a PST failure means that the LCP100 will return the blinking green light to solid green. The PST alert will still be visible via HART communication with the DVC6200 SIS.
4. If the red and green lights are both solid the valve is throttling in mid-travel.
5. The information contained in this table applies to firmware 9 and later.

Note

The primary safety function should be implemented by controlling the current (in point-to-point mode) or voltage (in multi-drop mode) from the logic solver. The red button is not intended to perform the primary safety function for the process.

Maintenance

⚠ WARNING

Electrostatic charge hazard. Do not rub or clean the LCP100 with solvents if a flammable vapor is present. To do so could result in an explosion.

The LCP100 has four major components; the housing, lights, conduit connections, and electronics. If a light is not working it can be replaced with the appropriate color. The conduit connections do not normally need replacement. The electronics module can be replaced as an assembly without having to disconnect the conduit connections or remove the box from its mounting.

Instrument Troubleshooting

If difficulties are experienced with the LCP100 control panel, refer to table 4.

Table 4. Instrument Troubleshooting

Symptom	Possible Cause	Action
1. Lights are not lit.	1. LCP100 is not properly connected to the digital valve controller aux. terminal.	1. Ensure that the LCP100 is connected correctly to the digital valve controller aux. terminal, as described in the Installation section of this manual.
2. LCP100 is properly connected to the digital valve controller aux. terminal, but the lights are not lit.	2. Power switch is not set correctly.	2. Ensure that the power switch is set correctly. If Loop Power is used, ensure that the switch position is set to Loop Power, and NOT 24 VDC, and vice versa.
3. The power switch is set correctly, but the lights are not lit.	3. Loop Power option is selected, but there is not enough current.	3. The Loop Power Option requires 8 mA current to operate. Ensure that there is sufficient current.
4. The LCP100 and the digital valve controller are properly connected, and there is sufficient current but the lights are not lit.	4. The LED may be damaged.	4. Replace LED.
5. Lights are blinking.	5. Valve is not at it's normal stop.	5. Check for proper calibration. Re-run calibration if necessary.
6. Proper calibration but lights are blinking.	6. Hi Hi / Lo Lo alerts settings not correctly set.	6. Ensure that the Hi Hi / Lo Lo Alert settings are 99 and 1% respectively. For large rotary valve, adjust settings to 98 and 2% and observe.

Parts Ordering

When corresponding with your Emerson Process Management sales office about this equipment, mention the serial number found on the nameplate (key 10, figure 9) of the unit. When ordering replacement parts, state the complete 11-character part number of each part required as found in the following parts list.

⚠ WARNING

Use only genuine Fisher replacement parts. Components that are not supplied by Emerson Process Management should not, under any circumstances, be used in any Fisher instrument. Use of components not supplied by Emerson Process Management may void your warranty and hazardous area approval, might adversely affect the performance of the instrument, and could cause personal injury and property damage.

Parts Kits

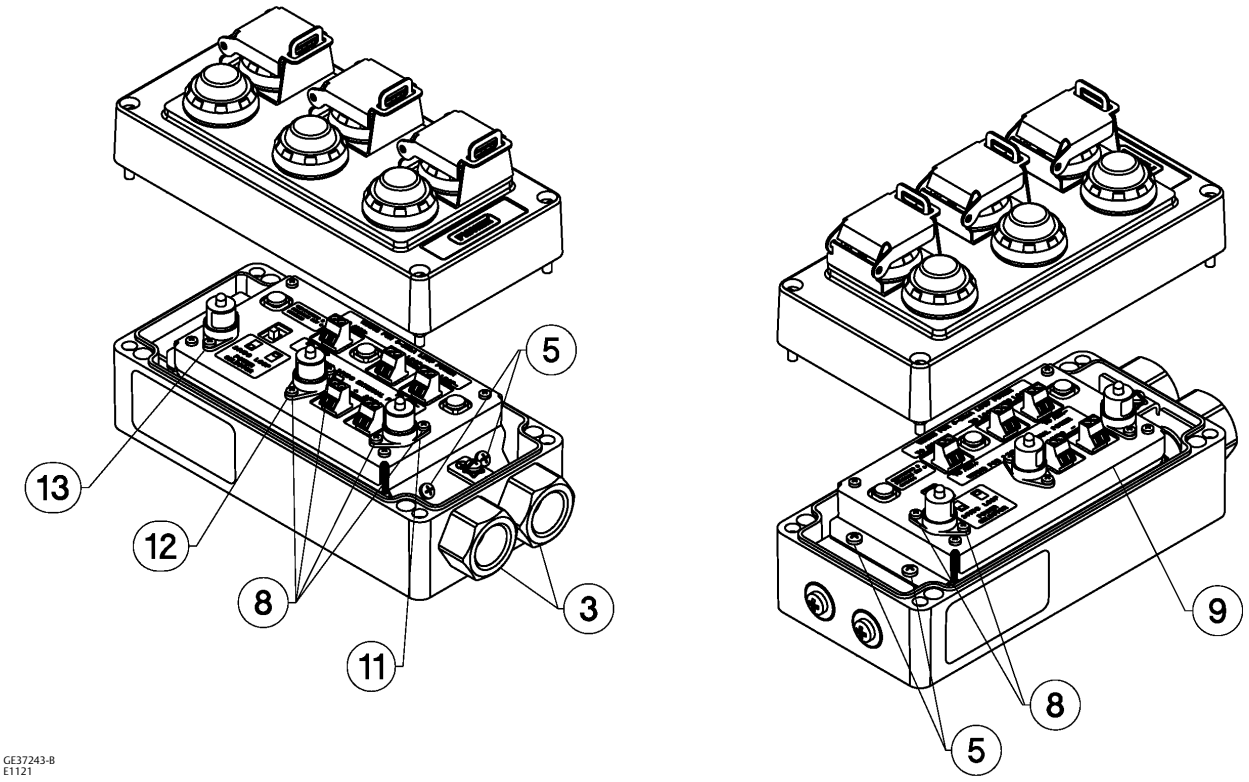
Description	Part Number
LED Assemblies Kit Includes LED's (qty. 3); Yellow, Red, and Green (keys 11*, 12*, and 13*, see figure 9) and fasteners (qty. 6) (key 8, see figure 9)	GE25751X012
Enclosure Labels Kit Includes labels (qty. 6); OPEN, CLOSED, VALVE OPEN, VALVE CLOSE, READY TO RESET, and VALVE TEST	GE25750X012

Parts List

Common Parts (see figures 9 and 10)

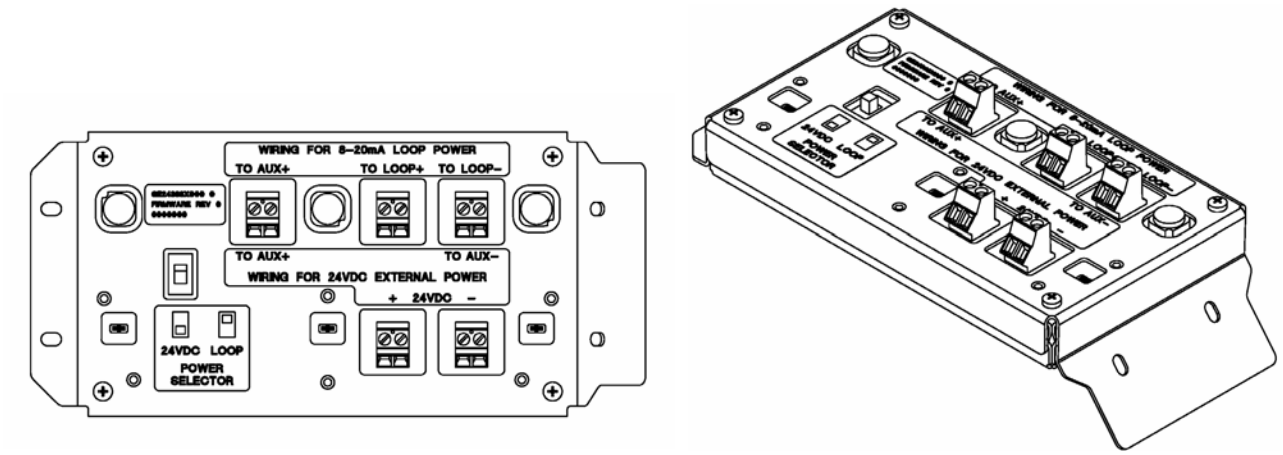
Key	Description	Part Number
3	3/4 NPT Conduit (2 req'd)	GE24442X012
	M20 Conduit (2 req'd)	GE34487X012
5	Machine Screw (4 req'd)	GE22073X012
9	Electronics Module (see figure 10)	GE39919X012

Figure 9. Fisher LCP100 Assembly



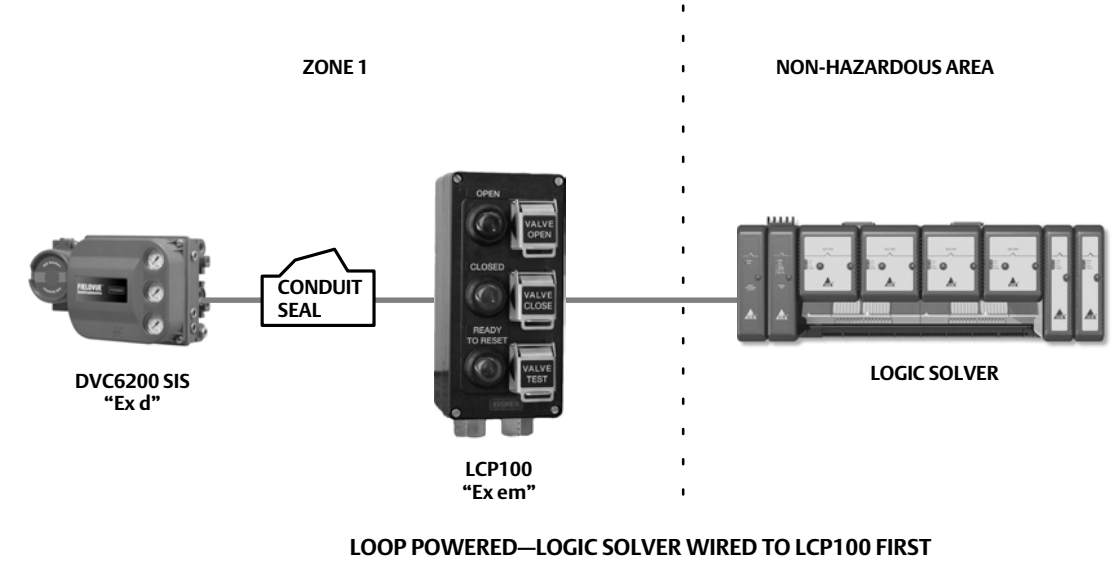
*Recommended spare parts
Only available in the LED Assemblies Parts Kit

Figure 10. Key 9, Electronics Module

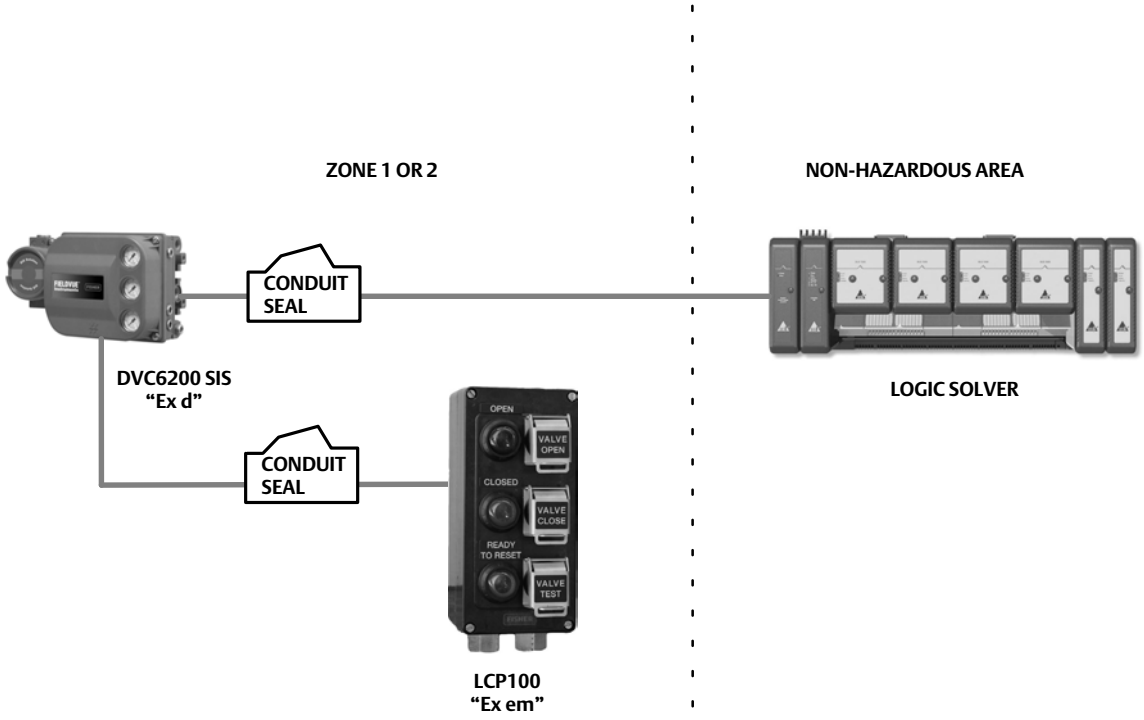


GE39919-A
E1122

Figure 11. Fisher LCP100 Connection to Explosion Proof “Ex d” FIELDVUE DVC6200 SIS; Loop Power



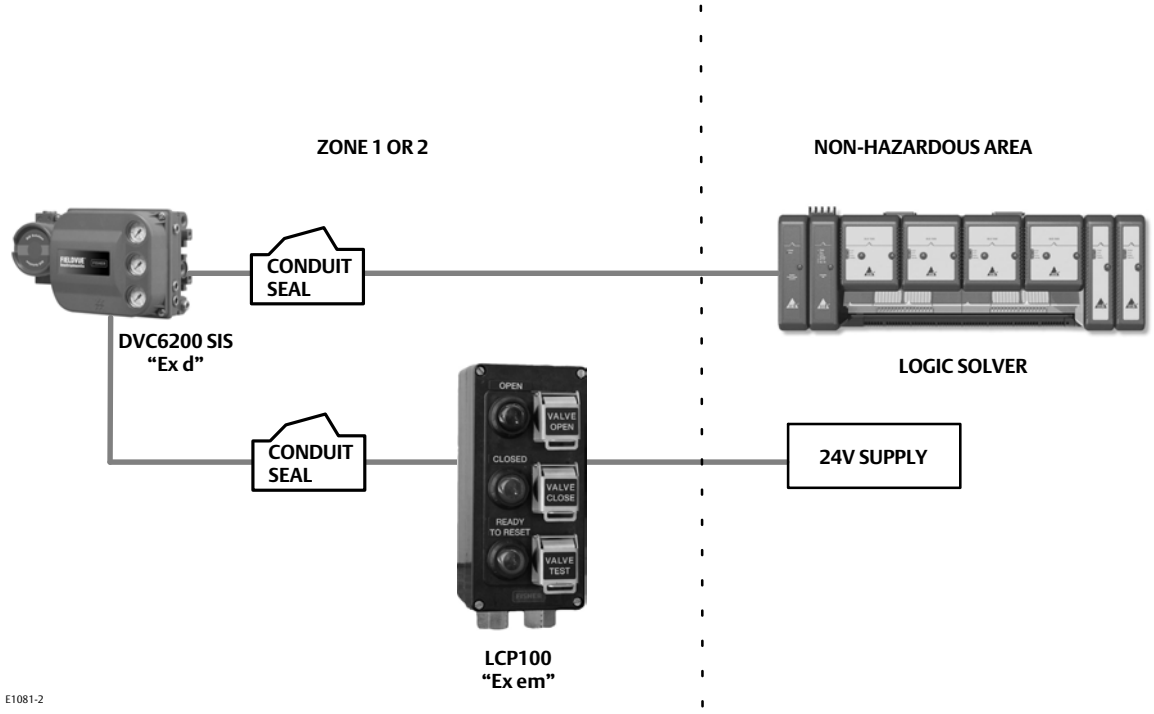
LOOP POWERED—LOGIC SOLVER WIRED TO LCP100 FIRST



E1080-2

LOOP POWERED—LOGIC SOLVER WIRED TO DVC6200 SIS FIRST

Figure 12. Fisher LCP100 Connection to Explosion Proof “Ex d” FIELDVUE DVC6200 SIS; 24 VDC Power



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